

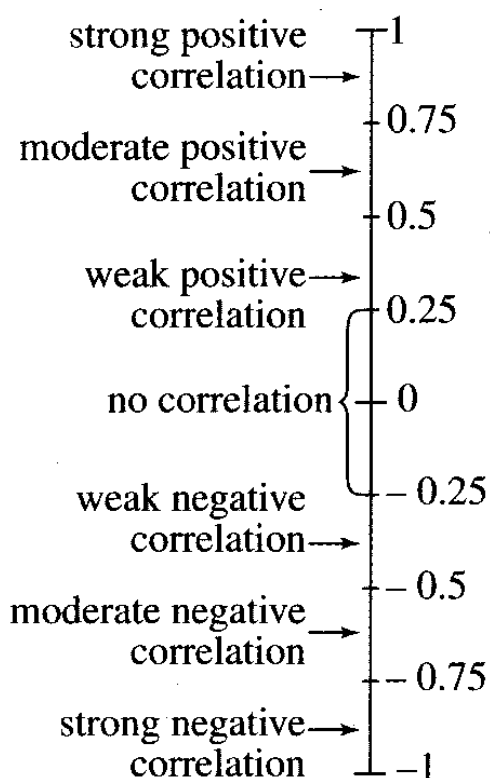
Correlation!

The pattern of the scatterplot gives an indication of the level of association (correlation) between the variables.

When one variable increases with another, there is a _____ correlation between them. **THINK GRADIENT!!**

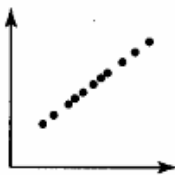
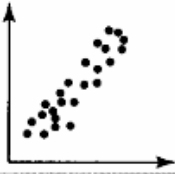
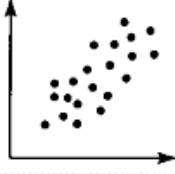
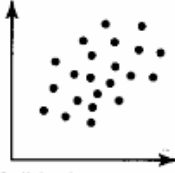
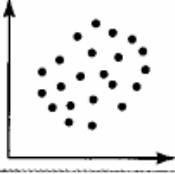
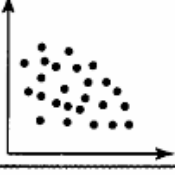
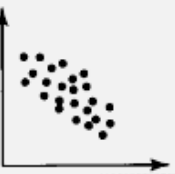


When one variable decreases with another, there is a _____ correlation between them.

The strength of a correlation is based on the **correlation coefficient**. The correlation coefficient is a measure of a correlation. The description of the correlation is given in the figure below.



Strong correlation between two variables does NOT necessarily mean that one variable “causes” the other eg there is a high correlation between a person’s shoe size and shirt size. One however, does not cause the other. Similarly, there is a high correlation between a high pulse rate and high intensity physical activity and this case, high intensity physical activity does effect pulse rate!

Causality refers to one variable causing another.

Correlation coefficient	Description	Scatterplot
1	<i>perfect positive correlation</i>	
between 0.75 and 1	<i>strong positive correlation</i>	
between 0.5 and 0.75	<i>moderate positive correlation</i>	
between 0.25 and 0.5	<i>weak positive correlation</i>	
between -0.25 and 0.25	<i>no correlation</i>	
between -0.5 and -0.25	<i>weak negative correlation</i>	
between -0.75 and -0.5	<i>moderate negative correlation</i>	
between -1 and -0.75	<i>strong negative correlation</i>	
-1	<i>perfect negative correlation</i>	

eg The operators of a casino keep records of the number of people playing a “Jackpot” type of game and compare the numbers playing to the size of the jackpot. The correlation coefficient for this game is calculated to be 0.65. Describe the correlation between the prize and the number of players.

eg A manufacturer who is interested in minimising the cost of training gives 15 of his plant operators different amounts of training and then measures the number of errors made by each of the operators. The results of the experiment are placed on a scatterplot and the correlation between the hours of training and the number of errors made is measured to have a correlation coefficient of -0.69.

- a) What can be said of the correlation between training and errors?
- b) What conclusion could the manufacturers make about causality in this case?

eg Discuss the expected strength of the relationship (ie the correlation) between the following variables:

- a) Speed and distance travelled;
- b) Age and weight of a baby, up to 12 months of age;
- c) Company expenditure on advertising sales;
- d) Height of 18 year old boys and mark in Mathematics in the HSC.